# Science Council of British Columbia

## Twelfth Annual Report 1989-90

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90-07035/

June 30, 1990

The Honourable Bruce Strachan,
Minister of Advanced Education,Training and Technology,
Province of British Columbia,
Parliament Buildings,
Victoria, B.C.
V8V 1X4

Dear Mr. Strachan:

I have the honour to present you the Twelfth Annual Report of the Science Council of British Columbia, and of the Secretariat on Science, Research and Development, for the year ending March 31, 1990.

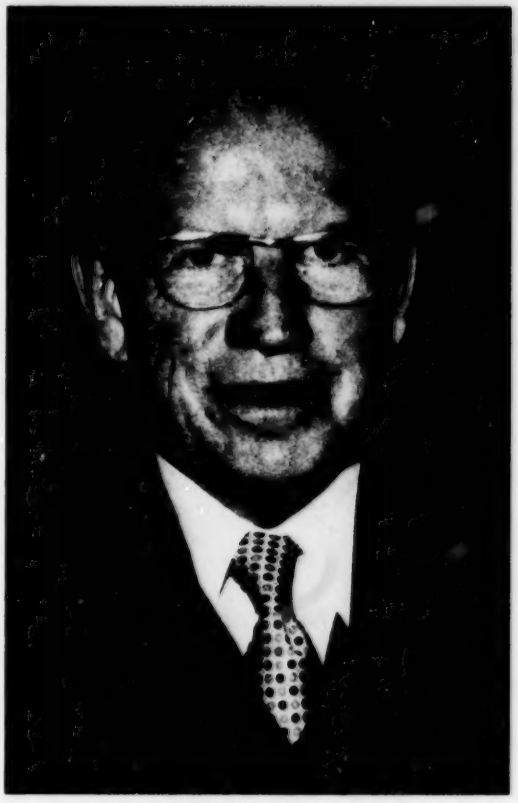
Respectfully submitted,

JAMcEwe

James A. McEwen,
Chairman,
Science Council of British Columbia

## In Memoriam

In the late 1970's Dr. Bill Armstrong was instrumental in establishing the Science Council of British Columbia and shaping its programs and activities. He was the right person in the right place at the right time and for what the Science Council has accomplished in the years since, we owe him a great deal of credit. Dr. Armstrong died in early July, 1990 after a long illness.



*Dr. Bill Armstrong*

A metallurgist by profession, born and educated in Ontario, he came to British Columbia in 1946. After working at B.C. Research he joined the U.B.C. Department of Metallurgy, becoming its head in 1964. He served as Dean of Applied Science from 1966 to 1969 and was Deputy President of the university from 1967 to 1974. In these roles, Bill provided a model of the benefits of university, industry and government partnerships and collaboration.

He left U.B.C. in 1974 to chair the new Universities Council and was then appointed the first Executive Director of the Research Secretariat of B.C. It was in this capacity that he provided the support that enabled the Science Council to begin operations in 1978. Shortly after his retirement in 1981, he was elected the first (and to date, only) Honorary member of the Science Council.

In addition to his academic, industrial and government service, Bill Armstrong was a man of many interests. He was an avid hiker and once climbed to the 4,000 metre summit of Mauna Kea in Hawaii, the site of the Canada-France-Hawaii telescope on whose board of directors he served for a number of years. He loved music and actively supported chamber music and symphony concerts in Vancouver. He also maintained a magnificent collection of orchids in his home.

His contributions to the scientific, industrial and cultural life of British Columbia will always be remembered, and those of us who knew him well will miss his guidance, humour and wisdom.

CHAIRMAN

Dr. James A. McEwen

PRESIDENT

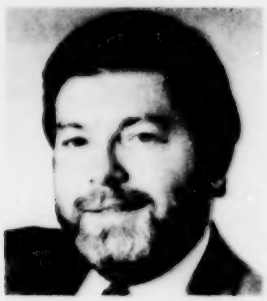
Dr. Denis J. Connor

Dr. Tom W. Calvert

Mr. Haig de B. Farris

Dr. Otto L. Forgacs

Ms. Gail S. Gabel



Dr. Brian W. J. Gillespie

Mr. Ian F. Greenwood

Dr. Julia G. Levy

Dr. Eric G. Manning

Mr. Keith V.S. Meyer

Dr. Robert C. Miller

Dr. L. Roy Queen

Dr. John A. Spence

Dr. Ken A. Spencer

# MEMBERS OF THE SCIENCE COUNCIL OF BRITISH COLUMBIA

*(List includes all those who served between April 1, 1989 and March 31, 1990)*

| Member | Date of First Appointment | Current Term Expires |
|---|---|---|
| Dr. James A. McEwen<br>Director, Biomedical Engineering<br>Vancouver General Hospital<br>Vancouver | September 18, 1986<br>**(Chairman)** | October 20, 1990 |
| Dr. William M. Armstrong<br>Retired<br>Vancouver | January 29, 1982 | Honorary Member |
| Mr. Graeme S. Balcom<br>President<br>Harmattan International Consulting<br>Vancouver | March 24, 1983 | September 1, 1989 |
| Dr. Tom W. Calvert<br>Vice President, Research and Information Systems<br>Simon Fraser University<br>Burnaby | January 7, 1988 | June 30, 1990 |
| Mr. Haig de B. Farris<br>Executive Vice President,<br>Ventures West Technologies<br>Vancouver | October 20, 1988 | October 1, 1991 |
| Dr. Otto L. Forgacs<br>Senior Vice President, Research and Development<br>MacMillan Bloedel Ltd.<br>Vancouver | October 20, 1988 | October 1, 1991 |
| Ms. Gail S. Gabel<br>Managing Director and C.E.O.<br>Aanderaa Instruments Ltd.<br>Victoria | January 7, 1988 | October 20, 1990 |
| Dr. D. Val George<br>Consultant<br>Terrace | January 7, 1988 | February 1, 1990 |
| Dr. Brian W. J. Gillespie<br>Vice President, Education<br>British Columbia Institute of Technology<br>Burnaby | February 1, 1990 | September 1, 1990 |
| Mr. Ian F. Greenwood<br>Interior Regional Manager<br>British Columbia Research Corporation<br>Kelowna | October 20, 1988 | October 1, 1991 |

**Members (continued)**

| Member | Date of First Appointment | Current Term Expires |
|---|---|---|
| Dr. Terry E. Howard<br>President<br>British Columbia Research Corporation<br>Vancouver | July 26, 1984 | September 1, 1989 |
| Dr. Peter A. Larkin<br>University Professor<br>University of British Columbia<br>Vancouver | March 14, 1985 | September 1, 1989 |
| Dr. Julia G. Levy<br>Vice President, Research and Development<br>Quadra Logic Technologies Inc.<br>Vancouver | January 7, 1988 | October 20, 1990 |
| Dr. Eric G. Manning<br>Dean of Engineering<br>University of Victoria<br>Victoria | January 7, 1988 | October 20, 1990 |
| Mr. Keith V. S. Meyer<br>General Manager<br>Cominco Metals Ltd.<br>Vancouver | March 3, 1989 | September 1, 1991 |
| Dr. Robert C. Miller<br>Vice President, Research<br>University of British Columbia<br>Vancouver | February 1, 1990 | September 1, 1990 |
| Dr. George W. Poling<br>Department of Mining and Mineral Process Engineering<br>University of British Columbia<br>Vancouver | February 23, 1984 | May 1, 1989 |
| Dr. L. Roy Queen<br>Clinical Orthodontist<br>Kamloops | February 1, 1990 | September 1, 1990 |
| Dr. John A. Spence<br>Director<br>British Columbia Aquaculture Research and Development Council<br>Vancouver | February 1, 1990 | September 1, 1990 |
| Dr. Ken A. Spencer<br>President<br>CREO Products Inc.<br>Burnaby | February 1, 1990 | September 1, 1990 |

# SCIENCE COUNCIL OF BRITISH COLUMBIA STAFF

| | |
|---|---|
| Dr. Denis Connor | President |
| Dr. Max Cairns | Director of Programs and Secretary to Council |
| Ms. Adrienne Brown | Receptionist (SPARK) (from October 30, 1989) |
| Ms. Susan Chambers | Awards Secretary (to August 31, 1989) |
| Ms. Terri Chanyungco | Awards Officer (from September 5, 1989) |
| Ms. Lynda Clarke | Finance and Administration Assistant (from September 5, 1989) |
| Ms. Laura Jo Gunter | Policy Coordinator (from November 23, 1989) |
| Ms. Kelly Hoekstra | Receptionist/Secretary (to May 31, 1989) |
| Ms. Louise Lamb | Administrative Assistant (SPARK) |
| Ms. Cindy Lee | Awards Secretary (from August 14, 1989) |
| Dr. ann lévi-lloyd | Policy Coordinator (to August 31, 1989) |
| Ms. Dawn Livera | Awards Officer (from February 19, 1990) |
| Mr. Vincent Lum | Awards Officer |
| Ms. Janet Maennling | Secretary (from June 13, 1989) |
| Mrs. Pauline McKeever | Executive Secretary |
| Ms. Tina Rasmussen | Awards Secretary |
| Ms. Valerie Rudelsheim | Receptionist (from January 2, 1990) |
| Ms. Deb Seibold | Director of Finance and Administration |
| Mr. Rick Warner | Awards Manager |
| Ms. Jennifer Wolfe | Communications Assistant |

Dr. Max Cairns

Ms. Adrienne Brown

Ms. Terri Chanyungco

Ms. Lynda Clarke

Ms. Laura Jo Gunter

Ms. Louise Lamb

Ms. Cindy Lee

Ms. Dawn Livera

Mr. Vincent Lum

Ms. Janet Maennling

Mrs. Pauline McKeever

Ms. Tina Rasmussen

Ms. Valerie Rudelsheim

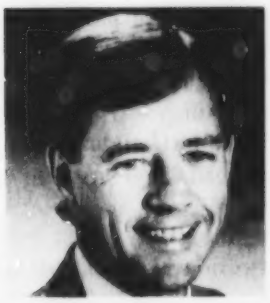
Ms. Deb Seibold

Mr. Rick Warner

Ms. Jennifer Wolfe

## SPARK COORDINATORS AND CONSULTANTS TO THE SCIENCE COUNCIL OF BRITISH COLUMBIA

| | |
|---|---|
| Dr. Laurence Evans | SPARK Environment Champion |
| Mr. Ian Howard | SPARK Overall Coordinator |
| Dr. ann lévi-lloyd | SPARK Information Technologies Coordinator |
| Mr. Bob Martin | SPARK Construction Coordinator |
| Dr. Joseph Mueller | SPARK Biotechnology Coordinator |
| Dr. George Poling | SPARK Mining Coordinator |
| Mr. David Roberts | SPARK Manufacturing Champion |
| Mr. David Rodger | Communications Manager |
| Dr. John Spence | Director, B.C. Aquaculture Research and Development Council |
| Dr. Dick Whitney | SPARK Health Coordinator |

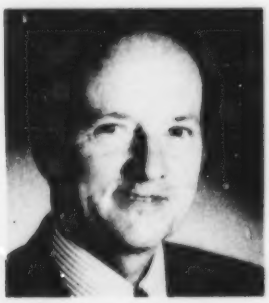


Dr. Lawrence Evans

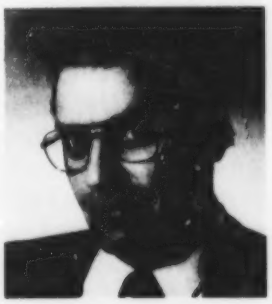
Mr. Ian Howard

Dr. ann lévi-lloyd

Mr. Bob Martin



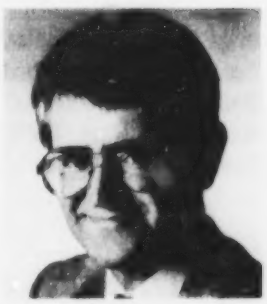
Dr. Joseph Mueller



Dr. George Poling

Mr. David Roberts

Mr. David Rodger



Dr. John Spence

Dr. Dick Whitney

# FROM THE CHAIRMAN

Council members and staff alike agree that 1989-90 has been a tremendously active and exciting year with the number of new intiatives, challenges and opportunties surpassing all others. It's bound to seem like a stepping stone, however, if the provincial government's newly created $420 million Science and Technology Fund is an indication of times to come. Science Council is delighted by the possibilities and potential that this magnitude of support will have for scientific research, development and awareness in this province over the next five years.

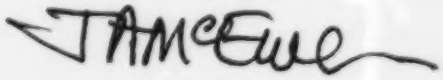
Through our extensive network of volunteers drawn from the major economic sectors in the province, the Science Council will play a strategic role in assisting the Ministry of Advanced Education, Training and Technology to determine how the Fund should be managed and allocated. We will be ready to participate to the fullest once the objectives for the fund are set.

It is particularly encouraging that a major commitment of the fund will be made to increase science awareness in B.C. This is also a goal of great importance to Science Council. People need to understand that in order to remain prosperous and internationally competitive British Columbia must diversify its economy and increase productivity. Communication needs to be fostered which will show that science and technology are the keys to building a strong economic future for this province.

Our guest speaker at the 1989 B.C. Science and Engineering Awards Dinner, Ms. Eve Savory, national science reporter for CBC National Television News, addressed specifically the challenges of increasing science literacy and enthusiasm. The fascination and the benefits of science and technology have to come through, she emphasized, to the target audience of today's young people.

The Science Council agrees and is involved in an increasing number of initiatives to "turn kids on to science and technology." Along with other programs, we have been a strong supporter of regional science fairs for many years and look forward to sponsoring the 1991 Canada Wide Science Fair to be held in Vancouver next May. Members of the Science Council and its network are also avid participants in the "Scientists in the Schools" program spending time inside classrooms throughout the province to give children a special insight into the career of a scientist, engineer or technologist. The enthusiasm of our young people is particularly rewarding and therein lies the future.

Relating to the more immediate future, on behalf of my colleagues and I on the Science Council of British Columbia, I would like to extend our gratitude and appreciation to our recently retired president, Denis Connor. His dedication and visionary leadership have had a monumental impact on Science Council achievements and directions. Our new president Tom Calvert, former Vice President of Simon Fraser University's Research and Information Systems and a Science Council member for two years, is certain to keep the momentum on the upswing. The future is bright for science and technology in B.C.



**James A. McEwen**
*Chairman*

# THE YEAR IN REVIEW

## THE MISSION

The Science Council's mission is to identify and promote opportunities for the sustainable economic development of British Columbia by drawing upon the science and technology community for creative applications of innovative science and technology.

## OVERVIEW

The twelve months beginning April 1, 1989 saw unprecedented activity at the Science Council of British Columbia. As you will read later in this report, new programs were created and existing ones expanded, the SPARK activity became fully operational and we moved to consolidate the Council's reorganization, made possible by the passage of a new Science Council Act by the provincial legislature.

It was also a time of transition. The Honourable Stan Hagen, who had been Minister Responsible for Science and Technology since 1987, moved on to become Minister of Regional and Economic Development, a position in which he is still able to do much to support science and technology in the province. We welcomed the Honourable Bruce Strachan as new Minister of Advanced Education, Training and Technology.

Five members of the Science Council retired during the year. These included Dr. Peter Larkin, Dr. Terry Howard, Dr. Val George, Mr. Graeme Balcom and Dr. George Poling. In February, the Minister announced that they would be replaced on the Council by:

**Dr. Brian Gillespie**, Vice President, Education, British Columbia Institute of Technology

**Dr. Robert Miller**, Vice President, Research, University of British Columbia

**Dr. Roy Queen**, Clinical Orthodontist, Kamloops

**Dr. John Spence**, Director, B.C. Aquaculture Research and Development Council, and

**Dr. Ken Spencer**, President, CREO Products Inc., Burnaby.

At the end of March, the Science Council announced the appointment of its new president, Dr. Tom Calvert, Vice President Research and Information Systems, at Simon Fraser University, who will assume his duties on July 1, 1990.

## PROGRAMS

Arrangements were made to combine the Science Council's decade-old Assistance Grants for Applied Research program with the Ministry of Advanced Education, Training and Technology's new Science and Technology Development Fund. Both programs had similar goals and rules and both were administered by the Science Council through its volunteer peer review committees with support from its programs department staff.

***GREAT** scholarship recipient **Stewart Johnson** of SFU's Department of Biological Sciences is studying methods to protect farmed salmon against parasites.*

*With support from the Health Development Fund* ***Martine Breault*** *of UBC's Dept. of Orthpaedics is developing robotic devices to aid in surgeical procedures.*

The names of the winners and the value of their grants are published elsewhere in this report. Still, it is worth comparing the value of grants distributed through the final AGAR competition, announced in September, 1989 ($2,860,170), with the results of the first combined STDF-AGAR competition announced in March, 1990 ($8,721,789).

Thirty-four new Graduate Research, Engineering and Technology (GREAT) scholarships were awarded in the single competition held during the year, while 37 other students in graduate studies at our three universities had their scholarships renewed. Meanwhile, we awarded three Science and Technology Awards for Returning Students (STARS) scholarships and renewed two. Twelve Industrial Postdoctoral Fellowships (IPDF) were awarded.

This was also the year in which we awarded our first Market Assessment of Research and Technology (MART) grants to university, college and technical institute researchers needing to determine whether markets exist for their innovations. We also announced our first grants under the new Health Development Fund, established by the provincial government and administered jointly by the Science Council and the B.C. Health Care Research Foundation.

## STRATEGIC PLANNING FOR APPLIED RESEARCH AND KNOWLEDGE (SPARK)

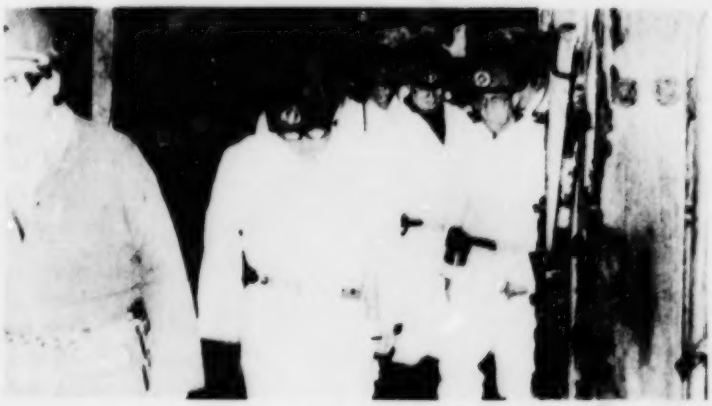
SPARK became fully operational in 1989-90. Advancing on a number of fronts, sector by sector, SPARK organized workshops and forums, published planning and strategy reports, hired champions or coordinators as required and published four editions of its newsletter, The SPARK Letter. Over 300 volunteers took part in the SPARK process.

## SCIENCE COUNCIL ACT

The provincial legislature passed a new Science Council Act in the summer of 1989. In addition to clarifying the Council's role and responsibilities as "an agent of the Crown", the new act formally establishes the position of President as Chief Executive Officer and identifies the staff, formerly employees of the Research Secretariat of B.C., as employees of the Science Council. The Research Secretariat no longer exists as such.

## OUTREACH

We put new efforts into creating more awareness of the Science Council's programs in parts of the province outside the southwest corner. The Council held one of its monthly meetings in Campbell River and another in Terrace and Kitimat. Meanwhile, members of the programs staff conducted seminars and workshops in several communities to make researchers and business people in those communities aware of Science Council programs.



*Council members emerging from Westmin's underground mine just outside Campbell River.*

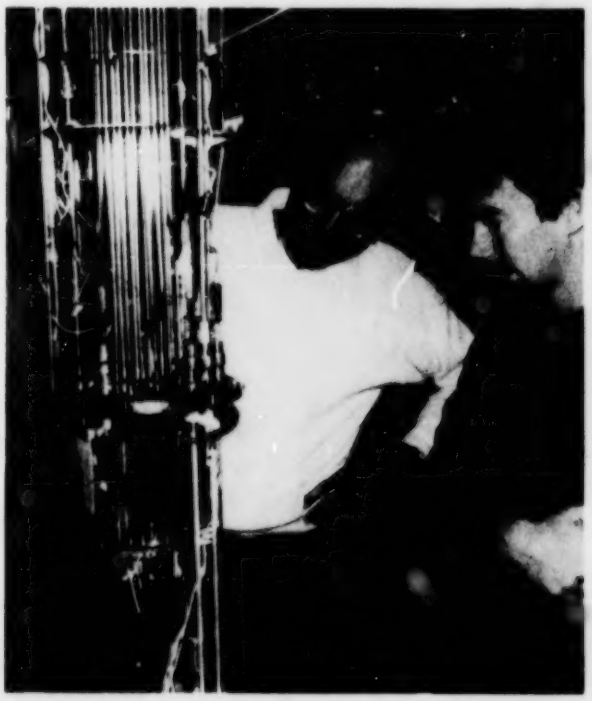
## B.C. SCIENCE AND ENGINEERING AWARDS

Since these Awards were created in 1980, they have been administered on behalf of the province by the Science Council. This year, three distinguished scientists accepted gold medals and acclaim at the awards dinner in October. They were:

**Dr. Walter Hardy** of the University of British Columbia's Physics Department, winner in the Natural Sciences category. Recognized throughout the world for his studies of solid molecular hydrogen and for developing the cold hydrogen maser, Dr. Hardy is a leading researcher in high critical temperature superconductors.

**Dr. Karel Klinka** of the University of British Columbia's faculty of Forestry, winner in the Applied Sciences category. Dr. Klinka has created a biogeoclimatic classification system for the forests of B.C. Through the use of this management tool, foresters are better able to make decisions regarding planting, nutrition and other areas affecting the forests.

**Dr. James McFarlane** of International Submarine Engineering Ltd., winner in the Industrial Innovation category. Submersibles built by Dr. McFarlane's company are being used throughout the world to explore seabeds and gather new information about ocean resources.



***Dr. Walter Hardy** (left), Gold Medal Winner, Natural Sciences*

***Dr. Karel Klinka** (right), Gold Medal Winner, Applied Sciences*

***Dr. James McFarlane**, Gold Medal Winner, Industrial Innovation*

The Science Council established three new awards, the first of which will be announced in 1990. These include the Cecil Green Award for Entrepreneurial Science, the Eve Savory Award for Science Communication, and the Science Council Chairman's Award for Lifetime Achievement.

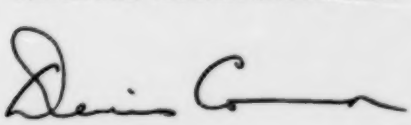
## SCIENCE AND TECHNOLOGY FUND

A few days following the end of our fiscal year, as preparation of this report began, the Minister of Finance, the Honourable Mel Couvelier, announced the creation of the $420 million Science and Technology Fund. It consolidated the funds that we could have anticipated over the next five years and added $300 million to them. To say that this fund will do much to enhance the goals that the science community have been striving for, would be an understatement. As we went to press, the Science Council and its network of hundreds of volunteers in every sector, were providing suggestions to the Ministry of Advanced Education, Training and Technology on the contents of the business plan for the fund.

## IN CONCLUSION

As this will be my last report to you as President, I'd like to thank the members of the Science Council, the staff and everyone in the science and technology community of British Columbia, for their essential support, encouragement and assistance during the past two years. I wish all of you, and especially my successor, Tom Calvert, continued growth and success in the years ahead.

The only way we will achieve our goal of continuing prosperity for our province and country is to have the continued committed support of volunteers who are at the forefront in their research and business endeavours.



**Denis J. Connor**
***President***

# SCIENCE COUNCIL OF B.C. –

**Schedule of Science and Technology Development Fund (S.T.D.F.) - Assistance Grants for Applied Research (A.G.A.R.) Commitments for the year ended March 31, 1990**

## 1. RESEARCH GRANT COMPETITION #20 (RC-20)

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| **A. AGRICULTURE & FOOD** | | |
| Dr. R. Blair<br>UBC, Animal Science | Improved productivity and health status of weanling pigs by enhancement of the immune function | 53,380 |
| Dr. J.F. Chang<br>Phero Tech Inc.,<br>Delta | Commercialization of sticky colour traps for pest management and trapping enhancement with host semiochemicals | 22,960 |
| Dr. R. Rajamahendran<br>UBC, Animal Science | Biotechnological manipulation of bovine embryos to optimize embryo transfer technology | 65,000 |
| **B. AQUATIC RESOURCES** | | |
| Dr. L.J. Albright<br>SFU, Biological Sciences | The culture of penned Sockeye salmon | 24,950 |
| Dr. P.V. Fankboner<br>SFU, Biological Sciences | Pearl culture in the abalone *Haliotis* | 53,153 |
| Dr. W.W. Kay<br>Microtek R & D Ltd.,<br>Sidney | Dried particle vaccines in aquaculture | 75,460 |
| Dr. D. Kitts<br>UBC, Food Science | Development and evaluation of serological assay for paralytic shellfish toxins in contaminated shellfish and crab | 72,374 |
| Dr. B.J. Skura<br>UBC, Food Science | Evaluation of modified packaging at 4°C, -3°C and -8°C for extending storage life of farmed Chinook salmon | 73,284 |
| **C. BIOTECHNOLOGY** | | |
| Dr. R.M. Branion<br>UBC, Chemical Engineering | Anaerobic/aerobic biological treatment and foam separation treatment of TMP/CTMP pulpmill wastewater for toxicity and BOD removal | 40,000 |
| Dr. C.P. Chanway<br>UBC, Forest Sciences | Microbial innoculation of conifer seedlings | 37,340 |

## 1. RESEARCH GRANT COMPETITION #20 (RC-20) – *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. J.L. Nichols<br>CB Research International Corp.,<br>Sidney | Development of commercial DNA probes for Apple Chlorotic Leafspot Virus (ACLV) and Apple Stem Grooving Virus (ASGV) | 41,000 |
| Dr. T.G. Owen<br>Helix Biotech Corp.,<br>Richmond | Gene probes: a new tool for wildlife forensics and conservation | 36,975 |
| **D. COMPUTERS & COMPUTING** | | |
| Dr. G.E. Birch<br>Neil Squire Foundation,<br>North Vancouver | Research and development of a unique voice recognition training software package | 70,000 |
| Mr. P. Capozzi<br>Panabode International Ltd.,<br>Richmond | Visually based home designer and pricing expert system | 104,000 |
| Mr. P. Dubois<br>Modatech Systems Inc.,<br>Vancouver | Retail Call Reporting System using "Write-Top" portable computing technology | 100,000 |
| Mr. H.A. Leach<br>Halco Software Systems,<br>Vancouver | Development of software for forest resource planning | 72,500 |
| Dr. T.L. Richardson<br>Richardson Industries,<br>North Vancouver | The development of a data acquisition and analysis system for brain research | 60,000 |
| Dr. J.C. Smith<br>UBC, Law | EPSILON Alternate Dispute Resolution Project | 100,000 |
| **E. ELECTRONICS & COMMUNICATIONS** | | |
| Mr. P. Berrang<br>Seastar Instruments Ltd.,<br>Sidney | Development of a single mode fibre optic connectorized laser diode | 79,000 |
| Mr. R. Blessin<br>Parallel Communications,<br>Langley | Computerized communications and dispatch system | 48,990 |
| Mr. A.D. Brown<br>Quantum Vision Corp.,<br>West Vancouver | Development of a machine vision system for the inspection of open-top salmon cans | 48,928 |

## 1. RESEARCH GRANT COMPETITION #20 (RC-20) – *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Mr. A. Carson<br>Carson Electronics,<br>Valemount | Inexpensive phase-lock frequency control and load management for small hydroelectric plants | 35,878 |
| Mr. T.G. Foxall<br>Signum Systems Inc.,<br>Burnaby | Development of a Digital Signal Processor (DSP) based data acquisition and analysis system | 47,800 |
| Mr. R.S. Porter<br>EDT Manufacturing,<br>Victoria | Development of a DTMF coded ultrasonic remote controller using unpowered tone generators | 37,000 |
| **F. ENERGY** | | |
| Mr. I. Buchmann<br>Cadex Electronics Inc.,<br>Burnaby | Programmable battery analyzer consisting of Cadex C3000 stand-alone unit and Cadex C6000 programmable battery slave module | 18,400 |
| Dr. I.S. Gartshore<br>UBC, Mechanical Engineering | Numerical and physical modelling of recovery furnaces | 65,000 |
| Dr. V.J. Modi<br>UBC, Mechanical Engineering | Fuel economy through aerodynamic drag reduction of truck/bus configurations | 77,460 |
| Dr. A.E. Steck<br>Ballard Advanced Materials Corp.,<br>North Vancouver | Development of a low-cost solid polymer electrolyte as an alternative to perfluorinated type membranes in fuel cells - Phase III | 90,309 |
| **G. FORESTS & FOREST PRODUCTS** | | |
| Dr. J.D. Barrett<br>UBC, Forestry | Advanced grading technology for structural lumber | 89,586 |
| Dr. F. Bunnell<br>UBC, Forest Sciences | Projecting indices of competition by salal | 19,660 |
| Dr. E. Camm<br>UBC, Forest Sciences | Is light-induced damage to the photosynthetic apparatus (photoinhibition) likely to contribute to planting check in newly planted conifer seedlings | 9,400 |
| Dr. D.T. Eadie/Dr. Tom Fyles<br>MB Research, UVic-Chemistry<br>Burnaby Victoria | Integrated peroxide brightening process using membranes to recover residual peroxide | 54,735 |

## 1. RESEARCH GRANT COMPETITION # 20 (RC-20) – *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Mr. J.M. Ewart<br>F.E.R.I.C.,<br>Vancouver | Operator restraining harness for a log skidding vehicle | 27,050 |
| Dr. D.P. Lavender<br>UBC, Forest Sciences | Improving cold hardiness of yellow cedar, western red cedar and white spruce seedlings | 11,320 |
| Dr. J.N. Owens<br>UVIC, Biology | Increased cone and seed production in yellow cedar production in yellow cedar seed orchards | 35,360 |
| Dr. P.R. Steiner<br>UBC, Forestry | Advanced wood-phenolic-resin composites | 35,800 |
| Dr. B.C.S. Sutton<br>B.C. Research Corp.,<br>Vancouver | Analysis of spruce hybrids using cytoplasmic DNA restriction fragment lengths | 44,800 |
| Dr. J.M. Webster<br>SFU, Biological Sciences | Use of recombinant DNA probes to identify the nematode complex affecting the forestry industry | 24,407 |
| Dr. G.F. Weetman<br>UBC, Forestry | Predicting growth response to fertilization for Western Hemlock, Western Red Cedar and Sitka Spruce on the B.C. coast | 92,236 |
| **H. HEALTH TECHNOLOGY** | | |
| Mr. R.W. Evans/Dr. M. Seear/<br>Dr. G. Sandor<br>B.C.'s Children's Hospital,<br>Vancouver | Development of a blood velocity meter | 99,077 |
| Mr. R.W. Evans/ Dr. J. Smyth<br>B.C.'s Children's Hospital,<br>Vancouver | A servo-controlled device for the regulation of inspired oxygen concentration in infants | 80,809 |
| **I. MANUFACTURING & MACHINERY** | | |
| Mr. C.R. Bussani/Dr. G. Auchinleck<br>Andronic Devices,<br>Vancouver | Development and evaluation of automated retraction systems for surgical procedures | 64,000 |
| Dr. K. Colbow<br>SFU, Physics | Laminated, tin oxide coated electrically heated windows | 55,000 |

## 1. RESEARCH GRANT COMPETITION #20 (RC-20) – *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Mr. E. Jackson<br>International Submarine Eng. Ltd.,<br>Port Coquitlam | Adaptive digital hydraulic pressure controller | 31,500 |
| Dr. F. Sassani<br>UBC, Mechanical Engineering | Computer assisted fabrication of orthodontic appliances | 45,000 |
| Mr. J. de Vaal<br>TIR Systems Ltd.,<br>Burnaby | Development of advanced optical materials for the efficient distribution of light energy | 143,064 |
| **J. MINING, MINERALS & METALS** | | |
| Dr. W.K. Fletcher<br>UBC, Geological Sciences | Exploration geochemistry of platinum and associated elements, southern British Columbia | 26,110 |
| Dr. A. Mular<br>UBC, Mining and Mineral Process Engineering | Cleaning of B.C. coal using column flotation | 21,615 |
| Mr. C. Nyberg<br>CETEC Sonics Inc.,<br>Burnaby | Sonic Grinder | 125,000 |
| Dr. K.W. Savigny<br>UBC, Geological Sciences | Rock slide/avalanche hazards affecting the Fraser Valley and lower Coquihalla Valley corridors in southwestern British Columbia | 10,000 |
| **L. AWARDS DECLINED** | 1 Award | 63,500 |
| | **(RC-20) TOTAL $ COMMITTED 1989-90 (51 Projects)** | **2,860,170** |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1)

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ 1989-90 COMMITTED |
|---|---|---|
| **A. AGRICULTURE & FOOD** | | |
| Dr. L. Gilkeson<br>Applied Bionomics Ltd.,<br>Sidney | Commercial production of biological control agents | 30,000 |
| Dr. A.D. Glass<br>UBC, Botany | Silicate as an agent for the control of diseases of greenhouse crops | 30,000 |
| Dr. S. Lau<br>Okanagan Federated Shippers Association, Kelowna | Prediction and non-chemical control of apple scald | 70,000 |
| Dr. K.R. Patel<br>AgriForest Technologies Ltd.,<br>Kelowna | Tissue culture technology for improvement and commercial production of fruit trees | 34,000 |
| Dr. M.D. Pitt<br>UBC, Plant Science | Development of grazing management programs that optimize returns from livestock grazing and coniferous regeneration on clearcuts | 12,000 |
| Dr. H. Schreier<br>UBC, Soil Science | Using quantitative remote sensing and GIS techniques to improve cranberry production | 23,500 |
| Dr. J. Shelford<br>UBC, Animal Science | Computerized dairy feed systems | 35,000 |
| Dr. M.L. Winston<br>SFU, Biological Sciences | Development of commercial applications for honey bee *(Apis mellifera L.)* queen pheromone | 45,000 |
| **B. AQUATIC RESOURCES** | | |
| Dr. R.M. Beames<br>UBC, Animal Science | Processing fish meal for Pacific salmon | 40,926 |
| Dr. T.A. Broadley<br>IEC Collaborative Marine R&D Ltd., Victoria | An economic assessment of culturing the Manila clam *(Tapes semidecussata)* in British Columbia | 41,648 |
| Mr. R. Brown<br>Elemental Research Inc.,<br>North Vancouver | Salmon marking and identification with laser ablation ICP-MS | 60,000 |
| Dr. D. Groves<br>Sea Spring Salmon Farm Ltd.,<br>Chemainus | Isolation of DNA probes capable of distinguishing male and female Pacific salmon | 57,000 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. B. Harvey<br>MTL Biotech,<br>Victoria | Cryopreservation of oyster eggs and larvae | 44,168 |
| Dr. G.K. Iwama<br>UBC, Animal Science | Development of simple field methods for the assessment of stress and general condition of fish in aquaculture facilities | 47,655 |
| Mr. G. Jones<br>Innovative Aquaculture,<br>Lasqueti Island | Develop hatchery and nursery technology for the purpose of producing low cost Manila clam *(Tapes Philippinarum)* seed | 60,615 |
| Dr. F. Law<br>SFU, Biological Sciences | A physiologically-based pharmacokinetic model of oxytetracycline in salmonids | 61,616 |
| Dr. K.V. Lo<br>UBC, Bioresource Engineering | Silage production from salmon farm mortalities | 31,740 |
| Dr. B. March<br>UBC, Animal Science | Nutritional and feeding management strategies for maximization of amino acid utilization for protein synthesis (growth) by salmonids | 46,776 |
| Dr. K. McErlane<br>UBC, Pharmaceutical Sciences | Determination of "wash-out" time for antibiotics and their tissue distribution in salmon | 104,989 |
| Dr. R. Petrell<br>UBC, Bioresource Engineering | Noninvasive enumeration and biomass determination of farmed fish | 45,000 |
| Dr. R.G.B. Reid<br>UVIC, Biology | Manila clam seed production enhancement | 30,000 |
| Mr. D.J. Saxby<br>Specialty Marine Products Ltd.,<br>Vancouver | To develop the technology to determine the distribution and biomass of *Euphausia pacifica* to enhance commercial fishing | 150,000 |
| Dr. G. Strasdine<br>B.C. Research Corp.,<br>Vancouver | Use of ozonated water to improve the quality and extended shelf life of B.C. oysters | 16,424 |
| Dr. J. Vielkind<br>UBC, Pathology | Non-destructive method for sex determination in salmonids | 55,000 |
| Dr. R.A. Wall<br>UBC, Pharmacology<br>& Therapeutics | Pharmacokinetics and metabolism of antiobiotics in salmonids | 50,834 |
| Mr. M. Winsby<br>Salt Spring Aquafarms Ltd..<br>West Vancouver | Evaluation of sterilized *(Triploid)* Coho during cage culture | 70,000 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| **C. BIOTECHNOLOGY** | | |
| Dr. P.E. Axelrood<br>B.C. Research Corp.,<br>Vancouver | Microbial innoculants and disease control strategies for conifer seedlings. | 127,500 |
| Dr. D.G. Kilburn<br>UBC, Biotechnology Laboratory | High intensity batch cultures of animal cells | 84,000 |
| Dr. R. Lansman<br>Quadra Logic Technologies Inc.,<br>Vancouver | Photodynamic therapy for AIDS: Extracorporeal inactivation of human immunodeficiency virus in blood | 68,000 |
| Dr. W.R. McMaster<br>UBC, Medical Genetics | Photodynamic killing of metastisized breast carcinoma cells | 66,200 |
| Dr. T. Trust<br>UVIC, Biochemistry &<br>Microbiology | DNA-based diagnostics for *Salmonella enteritidis* | 108,120 |
| **D. COMPUTERS & COMPUTING** | | |
| Mr. W. Baker<br>Tetrad Computer Applications Ltd.,<br>Vancouver | Development of socioeconomic databases of Canada for use with desktop demographics software. | 30,200 |
| Dr. G. Cooper<br>Glen Cooper & Associates Ltd.,<br>Vancouver | Cytogenetic expert system for laboratory management | 39,200 |
| Mr. M.K. Hendren<br>Synex Systems Corp.,<br>Vancouver | Standardized interfacing system for engineering computer software | 58,850 |
| Dr. O. Hungr/Mr. P.M. Byrne<br>O. Hungr Geotechnical<br>Research Inc., Vancouver | Extension of advanced methods of slope stability analysis into three dimensions | 12,680 |
| Dr. J.D. Jones/Dr. W. Havens<br>SFU, Engineering Science | Software for intelligent Computer-Aided Design | 88,000 |
| Mr. G. Josin<br>Neural Systems Inc.,<br>Vancouver | Neural network solutions for the inverse kinematics problem of redundant manipulators | 14,500 |
| Mr. J. Siegel<br>Press Porcepic Ltd.,<br>Victoria | Development of neural network capability for training and diagnostic simulations | 84,343 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Mr. R. Styan<br>Soft-SET Technologies Inc.,<br>Vancouver | To develop advanced testing tools for automating computer software testing | 57,000 |
| Dr. P.J. Voda<br>Complete Logic Systems Inc.,<br>North Vancouver | Trilogy 2 - A large application development platform | 85,000 |
| **E. ELECTRONICS & COMMUNICATIONS** | | |
| Dr. D.M. Camm<br>Vortek Industries Ltd.,<br>Vancouver | Development of an industrial solid-state laser | 113,616 |
| Dr. J.K. Cavers<br>SFU, Engineering Science | Toward the 64 kilobit transceiver: Phase II | 185,000 |
| Dr. V. Cuperman<br>SFU, Engineering Science | Rate-adaptive speech codec with error protection | 44,340 |
| Mr. M. Edmunds<br>Xantrex Technology Inc.,<br>North Vancouver | 2.5 KW system and burn-in power supply | 97,300 |
| Mr. M. El Banna<br>Narrowband Telecom Research Inc.,<br>Burnaby | Remote satellite data terminal. (Low power frequency synthesizer and low power receiver low noise amplifier development) | 82,000 |
| Dr. B. Funt/Mr. B. Truax<br>SFU, Computing Science | A new musical sound synthesizer | 44,910 |
| Mr. D. Gelbart<br>CREO Products Inc.<br>Burnaby | A laser plotter for "Direct Write" films | 154,650 |
| Mr. C. Gunn<br>Daniels Electronics Ltd.,<br>Victoria | Synthesized, ultra wideband receiver/ transmitter for 806-960 MHz | 55,390 |
| Dr. R.H.S. Hardy<br>SFU, Engineering Science | Data communications over mobile radio: Performance evaluation from a network perspective | 63,500 |
| Mr. R. Heenan<br>DSL Dynamic Sciences Ltd.,<br>Burnaby | Develop next-generation end-of-train telemetry equipment | 83,425 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Mr. B. Henderson<br>Anatek Microcircuits Inc.,<br>North Vancouver | Advanced low power, high speed digital processing for MIDI accessory applications | 139,025 |
| Mr. T. Hermary<br>Infosat Telecommunications Ltd.,<br>Burnaby | Development of a satellite communication controller for SCADA applications | 175,000 |
| Mr. D. Hobbs<br>Spectrum Signal Processing Inc.,<br>Burnaby | Passive backplane DSP computer board | 148,575 |
| Dr. S. Holdcroft<br>SFU, Chemistry | Electronically conducting polymers for photolithographic applications | 39,000 |
| Mr. P. Holland<br>DBA Communication Systems Inc.,<br>North Vancouver | Development of a small business digital telephone system based on non-optimal wiring | 76,847 |
| Mr. M.J. Jervis<br>Sierra-Misco Environment Ltd.,<br>Victoria | Advanced remote monitoring and control telemetry for large scale water and waste water management | 105,000 |
| Mr. J. Kramer<br>Plaser Light Corp.,<br>Burnaby | Development of the light driver power supply technology for use with high intensity discharge lamps | 113,271 |
| Dr. A.M. Leung<br>SFU, Engineering Science | Micromachining of silicon for sensor and actuator fabrication | 89,160 |
| Mr. A. Teron<br>Pacific Levitation Systems Inc.,<br>North Vancouver | 2 axis semi-conductor wafer transport | 118,988 |
| Dr. T. Tiedje<br>UBC, Physics & Electrical Engineering | Molecular beam epitaxy growth of III-V compound semiconductor films | 108,592 |
| Dr. B. Turrel<br>UBC, Physics | Development of the Superheated Superconductivity Granule (SSG) detector | 35,000 |
| **F. ENERGY** | | |
| Mr. G. Adams<br>Imagic Design Ltd.,<br>Burnaby | A power management system for supplying remotely powered DC loads in a harsh environment. | 70,000 |
| Dr. J.R. Grace<br>UBC, Chemical Engineering | A new process for natural gas reforming | 87,080 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. P.G. Hill<br>UBC, Mechanical Engineering | Intensifier-injector for natural gas fuelling of diesels | 142,040 |
| Mr. C. Perry<br>B.C. Research Corp.,<br>Vancouver | Development of an advanced exhaust catalyst and demonstration of a spark-ignition natural gas heavy duty engine | 41,117 |
| Dr. D. Romilly<br>UBC, Mechanical Engineering | Assessment of inspection criteria and techniques for recertification of NGV on-board storage cylinders | 69,000 |
| **G. ENVIRONMENTAL TECHNOLOGY & WASTE MANAGEMENT** | | |
| Dr. D.L. Golding<br>UBC, Forestry | The establishment of an irrigated popular plantation for disposal of sewage effluent | 71,460 |
| Mr. E. Ilniki<br>New Trend Oil Inc.,<br>Williams Lake | Market assessment study of reclaiming hazardous waste oil | 10,000 |
| Dr. J.P. Kimmins<br>UBC, Forest Sciences | Recycling urban sewage sludge and other organic "waste" as slow-release forest fertilizer | 85,440 |
| Mr. E. Lee<br>B.C. Research Corp.,<br>Vancouver | Development of a sequential anaerobic-aerobic process for dechlorination of kraft mill effluent | 55,000 |
| Dr. K.V. Lo<br>UBC, Bioresource Engineering | Aerobic biological treatment and utilization of swine wastes. | 47,540 |
| Mr. D. Sergius<br>Polar Industries Ltd.,<br>Coquitlam | Manufacture of a freon recovery system for the purpose of protecting the ozone | 25,000 |
| Mr. T. Webb<br>ESSA Ltd.,<br>Vancouver | Development of an integrated environmental impact assessment system that links an expert system to geographic information system | 48,385 |
| **H. FORESTS & FOREST PRODUCTS** | | |
| Mr. M. Bakst<br>H.A. Simons Ltd.,<br>Vancouver | Development of new design standards for prevention of structural steel corrosion in pulp and paper mills | 61,175 |
| Dr. T.A. Black<br>UBC, Soil Science | Effects of mechanical site preparation treatments on seedling microclimate, frost damage and growth | 42,420 |
| Dr. J.H. Borden<br>SFU, Biological Sciences | Novel and refined semiochemical treatments for bark and timber beetles | 50,484 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. J.E. Carlson<br>UBC, Forest Sciences | DNA marker-assisted selection for weevil resistance in spruce | 98,500 |
| Dr. A. Cornford<br>Simon Fraser Univentures Corp., Burnaby | Prototype research and development for an integrating fluorometer system | 48,297 |
| Mr. P. Crammond<br>CAE Machinery Ltd., Vancouver | A system for optimizing recovery from straight or curved logs of 24" or less | 74,800 |
| Dr. Y.A. El-Kassaby<br>Cdn. Pacific Forest Products Ltd., Saanichton | Genetic evaluation of seed crop harvesting, handling and seedling production practices | 54,266 |
| Dr. M. C. Feller<br>UBC, Forestry | Effects of slashburning and mechanical site preparation treatments on productivity of Engelmann Spruce - Subalpine Fir Forests | 56,610 |
| Mr. R.A. Furber<br>Intec Inoventures Inc., Victoria | Automated bunching and wrapping forest seedlings | 56,136 |
| Dr. S.C. Grossnickle<br>B.C. Research Corp., Vancouver | Stock quality assessment and field performance of interior spruce from embryogenesis tissue culture | 121,000 |
| Mr. E.A. Hamm<br>Forintek Canada Corp., Vancouver | Application of ultrasonics to detection of compression wood | 18,089 |
| Dr. C.D.B. Hawkins<br>MacMillan Bloedel Ltd., Nanaimo | SIVE: A seedling quality test for all phases of forest renewal (nursery to field) | 47,583 |
| Mr. E. Kirbach<br>Forintek Canada Corp., Vancouver | Feed speed and guide arm control for sawing logs and cants | 93,905 |
| Dr. K. Klinka<br>UBC, Faculty of Forestry | Effects of climate, soil water, and soil nutrients on growth of coastal Western Hemlock | 55,600 |
| Dr. P. Lawrence<br>UBC, Electrical Engineering | Remote binocular vision system for grapple yarding | 48,194 |
| Dr. D.T. Lester<br>UBC, Forest Sciences | Genetic control of wood shrinkage, fibril angle, and spiral grain in juvenile wood of Douglas fir | 20,600 |
| Dr. S. Lindgren<br>Phero Tech Inc., Delta | Aggregation inhibiting pheromones of bark beetles | 46,209 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. P. Marshall<br>UBC, Forest Resources Managment | Development of forest mensuration and biometrics software | 25,650 |
| Mr. G.R. Middleton<br>Forintek Canada Corp.,<br>Vancouver | Developing methods to sort and dry lodgepole pine for maximum joinery yields | 144,156 |
| Dr. D.T. Price<br>Micromet Systems Inc.,<br>Vancouver | Computerized, controlled temperature plate for testing optimal seed germination | 11,300 |
| Dr. D. Roberts<br>B.C. Research Corp.,<br>Vancouver | Storage protein status as a measure of seedling quality | 29,584 |
| Mr. B.J. Sauder<br>MB Research,<br>Burnaby | Transportation of ambrosia beetles in the industrial milieu of coastal B.C. | 161,117 |
| Dr. B.C.S. Sutton<br>B.C. Research Corp.,<br>Vancouver | Molecular genetic analysis of conifers for seed orchard and tree improvement planning | 40,000 |
| Dr. P. Von Aderkas<br>UVIC, Biology | Artificial seed of western Larch | 36,000 |
| Dr. Y. Wand<br>UBC, Commerce &<br>Business Administration | Applications of expert systems technology to forestry site preparation decisions | 41,976 |
| Dr. S. Withers<br>UBC, Chemistry | Environmentally benign control of the fungal degradation of wood products | 90,060 |
| **I. HEALTH TECHNOLOGY** | | |
| Dr. M. Altamirano<br>Concord Biomedical Corp.,<br>Burnaby | DNA probe for the detection of tuberculosis | 64,980 |
| Dr. M.B. Burbank<br>CTF Systems Inc.,<br>Port Coquitlam | A prototype multichannel whole-head biomagnetic imaging system | 130,000 |
| Dr. S. Dost<br>UVIC, Mechanical Engineering | Mechanical prostheses for vertebral body replacements | 38,800 |
| Dr. V. Hyrman<br>Electro Medical Technology Corp.,<br>Vancouver | Development of a computer based ECT instrument prototype demonstration | 50,000 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. P. Logan<br>Quadra Logic Technologies Inc.,<br>Vancouver | Development of light delivery device for photodynamic therapy of genital warts | 90,613 |
| Dr. S. Nakai<br>UBC, Food Science | A new homogenizing-pasturizer for human milk banking | 47,000 |
| Mr. M. Roch<br>RE TECH Ltd.,<br>Victoria | Purification of eicosapentaenoic and docosahexaenoic acid from salmon oil by high pressure liquid chromatography | 74,000 |
| Dr. J.T. Sample<br>EBCO Industries Ltd.,<br>Richmond | Development of cyclotrons and associated equipment for medical applications | 194,000 |
| Dr. F.R. Sharp<br>Dr. F. Ross Sharp Ltd.,<br>Vancouver | Bench model fabrication and working prototype production of safety syringe | 60,000 |
| Mr. D. Short<br>Med*Ex Diagnostics of Canada,<br>Coquitlam | Dedicated exercise stations | 36,129 |
| Dr. D. Wensley<br>B.C.'s Children's Hospital,<br>Vancouver | A device for the early recognition of respiratory changes in ventilated children | 43,000 |

### J. MANUFACTURING & MACHINERY

| | | |
|---|---|---|
| Dr. P. Agathoklis<br>UVIC, Electrical & Computer Engineering | Development of an adaptive controller for steering of a hydrographic survey craft | 38,590 |
| Mr. D. Asplin<br>Offshore Systems Ltd.,<br>North Vancouver | Autonomous underwater vehicle navigation for S.P.I.R.I.T. | 25,000 |
| Mr. P. Brooke<br>SEI Industries Ltd.,<br>Richmond | Helicopter firefighting pump attack unit | 62,767 |
| Dr. S. Cherry<br>UBC, Civil Engineering | Innovative seismic retrofit and design of buildings and equipment | 50,820 |
| Mr. J. Chia<br>H.E.R.O. Industries Ltd.,<br>Burnaby | Molded diaphragm | 38,000 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Mr. K. Collyer<br>Atlantic Engineering Company,<br>North Vancouver | Shallow water diving system development program | 25,000 |
| Dr. A. Dunwoody<br>UBC, Mechanical Engineering | Rudder roll reduction within an adaptive autopilot | 23,100 |
| Mr. B. Farnworth<br>Mustang Industries Inc.,<br>Richmond | Water vapour permeable buoyant insulation | 57,000 |
| Mr. R. Gillie<br>BT Sports Inc.,<br>Sidney | Windsurfing magnetic safety harness | 30,000 |
| Mr. F. Gilowski<br>Okanagan Aggregates Ltd.,<br>Armstrong | Cold in place recycling of asphaltic concrete pavements | 50,000 |
| Dr. P. Lawrence<br>UBC, Electrical Engineering | Coordinated control of heavy equipment | 65,195 |
| Mr. M. Lookman<br>A & R Metal Industries,<br>Richmond | Productivity improvements robotic welding workcell | 52,454 |
| Mr. P. Mielcarski<br>Dynapro Systems Inc.,<br>Vancouver | Load cell interface for weigh scale applications in batch processes | 50,000 |
| Mr. J. Mikkelson<br>Westec Equipment Ltd.,<br>Vancouver | Improvement for jet pumps; bow thrusters propulsive efficiency | 60,000 |
| Dr. M. Movassaghi<br>Beaver RX Enterprises Ltd.,<br>Surrey | Design, development and testing of composite landing gear system | 11,800 |
| Dr. E. Naesgaard<br>Macleod Geotechnical Ltd.,<br>West Vancouver | Lateral load test to review seismic behavior of expanded base piles | 65,792 |
| Mr. D. Patterson<br>Infrascan Inc.,<br>Richmond | Automated inspection system for randomly packaged agricultural product | 50,000 |
| Mr. G.A. Pawelchak<br>Stuart Plastics Ltd.,<br>Burnaby | The development of high performance Electromagnetic Interference (EMI) and Electrostatic Dissipation (ESD) coatings for plastic | 30,000 |

## 2. RESEARCH GRANT COMPETITION #1 (SA–1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. A.D. Russell<br>CICON R&D Ltd.,<br>Vancouver | Advanced planning tools for large, complex construction projects | 45,000 |
| Dr. B. Tabarrok<br>UVIC, Mechanical Engineering | Further developments of the UTEMP finite element program for engineering design | 38,000 |
| Mr. G. Warner<br>Warner Shelter Corp.,<br>Vancouver | Advanced technical fabric structure design/manufacturing centre | 50,000 |
| **K. MINING, MINERALS & METALS** | | |
| Mr. G. Carlson<br>Gulf International Minerals,<br>Vancouver | Precious metal mineralization, Iskut River area, Northwestern B.C. | 74,552 |
| Dr. B. Caughlin<br>Chemex Labs Ltd.,<br>North Vancouver | A fully automated extraction system for metals analysis in geological materials | 37,553 |
| Dr. C.I. Godwin<br>UBC, Geological Sciences | Optimization of exploration decisions by application of galena lead isotope data in B.C. | 15,500 |
| Dr. J.S. Laskowski<br>UBC, Mining & Mineral Process Engineering | Pilot plant study on the effect of dense medium rheology on fine coal beneficiation | 60,000 |
| Dr. A. Sinclair<br>UBC, Geological Sciences | Geostatistical ore reserve estimation of B.C. precious metal deposits. | 67,750 |
| Ms. M. Windfeld<br>Clayburn Industries Ltd.,<br>Abbotsford | Refractories for smelting magnesium. | 41,480 |
| **L. AWARDS DECLINED** | 3 Awards | 90,000 |
| | **(SA-1) Total $ Committed 1989-90<br>(140 Projects)** | **8,721,789** |

# INDUSTRIAL POST DOCTORAL FELLOWSHIPS AWARDED 1989-90

## 1. NEW AWARDS

| Award Recipient | Discipline<br>Year of Graduation<br>University | Employing Company | $<br>Awarded |
|---|---|---|---|
| Dr. R. L. Thies | Pharmacology<br>1987 U. of Iowa | Canadian Liposome Co.,<br>North Vancouver | 25,000 |
| Dr. A. Kuma-Mintah | Chemistry<br>1989 UBC | Polymer Engineering,<br>New Westminster | 25,000 |
| Dr. C. J. Myers | Genetics<br>1988 UBC | CBR International,<br>Sidney | 25,000 |
| Dr. R. G. Racca | Physics<br>1990 UVIC | Vivitro Systems Inc.,<br>Victoria | 25,000 |
| Dr. W. G. McMullan | Physics, Mathematics<br>1981 SFU | SF Univentures,<br>Burnaby | 25,000 |
| Dr. A. J. Stock | Forest Entomology<br>1989 SFU | Pacific A.I. Systems,<br>Burnaby | 25,000 |
| Dr. A. P. Hornby | Pathology<br>1989 UBC | JR Laboratories,<br>Burnaby | 25,000 |
| | | **Subtotal (7 awards)** | **175,000** |

## 2. RENEWAL AWARDS

| Award Recipient | Discipline<br>Year of Graduation<br>University | Employing Company | $<br>Awarded |
|---|---|---|---|
| Dr. J. F. Chang | Entomology<br>1986 Texas A&M | Phero Tech Inc.,<br>Delta | 25,000 |
| Dr. D. Renfrew | Botany-Phycology<br>1988 UBC | Agar Technologies,<br>Vancouver | 25,000 |
| Dr. G. E. Birch | Electrical Engineering<br>1988 UBC | Regenesis Development Corp.,<br>North Vancouver | 25,000 |
| Dr. G. Thomas | Inorganic Electro/Chemistry<br>1984 U. of Hyderabad (India) | Moli Energy Ltd.,<br>Burnaby | 25,000 |
| Dr. H. Timmenga | Soil Biology<br>1988 UBC | B.C. Research Corp.,<br>Vancouver | 25,000 |
| | | **Subtotal (5 awards)** | **125,000** |
| | | **Total (12 awards)** | **300,000** |

# G.R.E.A.T. SCHOLARSHIPS AWARDED 1989-90

## 1. NEW AWARDS (Competition GC-9)

| Name of Student | University & Department(s) | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s) | $ Value |
|---|---|---|---|---|
| G. Byford | UBC, Forest Science | J.A. McLean | B.C. Forest Service, Victoria | 14,000 |
| M.D. Calder | UBC, Animal Science | R. Rajamahendran | Helix Biotech, Richmond | 14,000 |
| H.P.Y. Chow | UBC, Electrical Engineering | S. Kallel | Mobile Data Intl., Richmond | 6,500 |
| G.E. Corley-Smith | SFU, Biology | B.A. McKeown | 1) Royal Seafarms, Vancouver<br>2) Dept. of Fisheries & Oceans, West Vancouver | 14,000 |
| M. Davenport | UBC, Physics | G.W. Hoffman | Microtel Pacific Research, Burnaby | 14,000 |
| D. Diliorio | UVIC, Physics/Astronomy | R.W. Stewart | Institute of Ocean Sciences, Sidney | 14,000 |
| R. Fong | UBC, Chemistry | K.A.R. Mitchell | Moli Energy Ltd., Burnaby | 7,500 |
| J.C. Glaubitz | UBC, Forest Science | J. Carlson | Canadian Pacific Forest Products, Vancouver | 14,000 |
| D. Hunt | UBC, Microbiology | J. Levy | Quadra Logic Tech. Inc., Vancouver | 14,000 |
| J. Hunt | UBC, Geological Sciences | R.M. Bustin | Geological Survey of Canada, Vancouver | 14,000 |
| M. Hutzinger | SFU, Chemistry | A.C. Oehlschlager | Phero Tech Inc., Delta | 14,000 |
| C. Jamieson | UBC, Microbiology | J. Levy | Quadra Logic Tech. Inc., Vancouver | 14,000 |
| M. Jull | UBC, Forest Science | G. Weetman | 1) Balco Ind.<br>2) Ministry of Forests, Victoria | 14,000 |
| N.A. Kummen | SFU, Biological Science | J.H. Borden | B.C. Forest Service, Victoria | 14,000 |
| B.F. Lehmann | UBC, Mechanical Engineering | S.G. Hutton | MacMillan Bloedel Research, Burnaby | 14,000 |

## NEW AWARDS (Competition GC-9) - *Continued*

| Name of Student | University & Department(s) | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s) | $ Value |
|---|---|---|---|---|
| H.A. Leitch | UBC, Microbiology | J. Levy | Quadra Logic Tech. Inc., Vancouver | 14,000 |
| D.T. Lowery | UBC, Plant Science | M.B. Isman | Safer Ltd., Victoria | 5,000 |
| T.A. Makinen | SFU, Natural Resource Management | M. Jaccard | B.C. Hydro, Vancouver | 6,500 |
| C. Matteau | SFU, Biological Science | J.H. Borden | 1) B.C. Coast Vegetable Co-op Assn., Richmond<br>2) Agriculture Canada, Vancouver<br>3) Monagro Ltd., Richmond | 6,500 |
| M. Merkens | SFU, Biological Science | A.S. Harestad | Phero Tech Inc., Delta | 14,000 |
| C. Messier | UBC, Forest Science | J.P. Kimmins | Western Forest Products, Vancouver | 9,079 |
| D. Morewood | UVIC, Biology | R. Ring | Applied Bionomics Ltd., Sidney | 6,500 |
| J. Morgan | UBC, Animal Science | G.K. Iwama | 1) EVS Consulting, West Vancouver<br>2) Dept. Fisheries & Oceans, Victoria | 14,000 |
| M. Namchuk | UBC, Chemistry | S. Withers | Forintek Canada Corp., Vancouver | 14,000 |
| K. Naumann | SFU, Biological Science | M.L. Winston | Phero Tech Inc., Delta | 5,000 |
| G. O'Neill | UBC, Forest Science | C.P. Chanway | B.C. Research Corp., Vancouver | 14,000 |
| C. Parfeniuk | UBC, Metals & Materials Engineering | F. Weinberg | Johnson Matthey Electronics, Trail | 14,000 |
| D. Small | UBC, Electrical Engineering | M.R. Ito | MacDonald Dettweiler & Assoc., Richmond | 14,000 |
| M. Stazyk | UBC, Physics | R.R. Johnson | TRIUMF, Vancouver | 6,500 |

## NEW AWARDS (Competition GC-9)- *Continued*

| Name of Student | University & Department(s) | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s) | $ Value |
|---|---|---|---|---|
| I. Steveson | UVIC, Biochemistry & Microbiology | S. Misra | Vernon Seed Orchard, Vernon | 5,000 |
| W.P. Stewart | UBC, Civil Engineering | R.G. Campanella | Conetec Investigations Ltd., Vancouver | 14,000 |
| J.C. Thornton | UVIC, Biochemistry & Microbiology | W. Kay | Microtek R & D Ltd., Sidney | 5,000 |
| A. Van Woudenberg | UBC, Forest Science | F.L. Bunnell | Tolko Industries, North Vancouver | 14,000 |
| L. Zedel | UBC, Oceanography | S. Pond | Institute of Ocean Sciences, Sidney | 14,000 |
| | | | **Subtotal (34 awards)** | **391,079** |

## 2. RENEWAL AWARDS - Year 2 (Competition GC-9)

| Name of Student | University & Department(s) | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s) | $ Value |
|---|---|---|---|---|
| B. Allison | UBC, Microbiology | J.G. Levy | Quadra Logic Tech. Inc., Vancouver | 14,000 |
| P. Aubry | UVIC, Electrical Engineering | R. Vahldieck | TRL Microwave Tech., Burnaby | 14,000 |
| N. Bepple | UBC, Oceanography | W. Hsieh | Macdonald Dettwiler& Assoc., Richmond | 14,000 |
| D.M. Bruns | UVIC, Biology | J.N. Owens | 1) Fletcher Challenge, Vancouver<br>2) Pacific Forestry Centre, Victoria | 14,000 |
| D. Butler | UBC, Geophysics & Astronomy | T. Watanabe | B.C. Hydro, Vancouver | 14,000 |
| Y. Carriere | SFU, Biology | B.D. Roitberg | Agriculture Canada, Vancouver | 14,000 |
| E. Charter | UBC, Bio-Resource Engineering | V. Lo | Canadian Lysozyme Inc., Abbotsford | 5,000 |
| L. De Montigny | UBC, Forest Science | G.F. Weetman | Western Forest Products, Vancouver | 14,000 |
| S.A. Dehler | UBC, Geophysics & Astronomy | R.M. Clowes | Geological Survey of Canada, Vancouver | 14,000 |

## 2. RENEWAL AWARDS - Year 2 (Competition GC-9) *Continued*

| Name of Student | University & Department(s) | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s) | $ Value |
|---|---|---|---|---|
| J. Ens | UBC, Electrical Engineering | P. Lawrence | MacDonald Dettwiler & Assoc., Richmond | 5,000 |
| J. Findlay | UBC, Electrical Engineering | M. Beddoes | VGH Biomedical Eng., Vancouver | 6,500 |
| B. Flinn | UBC, Botany | I.E.P. Taylor | B.C. Research Corp., Vancouver | 14,000 |
| W. Hajen | UBC, Animal Science | R.M. Beames | Dept. of Fisheries & Oceans, West Vancouver | 6,500 |
| C. Higgins | UBC, Zoology & Plant Science | J. H. Myers | 1) Phero Tech Inc., Delta<br>2) Agriculture Canada, Vancouver | 14,000 |
| A. Hornby | UBC, Medical Genetics | W.R. McMaster | Quadra Logic Tech. Inc. Vancouver | 14,000 |
| F. Hovey | SFU, Biological Science | S. Harestad | Flathead Grizzly Bear Project, Marysville | 5,000 |
| R. O. Hudson | UBC, Forest Resource Management | D. Golding | Weyhaeuser Canada, Okanagon Falls | 14,000 |
| L. Husted | UBC, Forest Science | D. Lavender | Canadian Forestry Service, Victoria | 14,000 |
| S. C. Johnson | SFU, Biological Science | L.J. Albright | Norent Inc., Campbell River | 14,000 |
| A. D. Kot | UBC, Electrical Engineering | C. Leung | Mobile Info Tech., Burnaby | 14,000 |
| O. Lee | UBC, Chemistry | A. P. Wade | Paprican, Vancouver | 5,000 |
| J. P. Michaud | SFU, Biological Science | M. Macauer | B.C. Honey Prod. Assoc., Vernon | 14,000 |
| D. G. Michelson | UBC, Electrical Engineering | E. V. Jull | Offshore Systems Ltd., North Vancouver | 14,000 |
| L. Nichol | UBC, Animal Science | D. M. Shackleton | Vancouver Aquarium, Vancouver | 14,000 |
| L. Proctor | UVic, Linguistics | J.F. Kess | Acquired Intelligence Inc., Victoria | 14,000 |

## 2. RENEWAL AWARDS - Year 2 (Competition GC-9) *Continued*

| Name of Student | University & Department(s) | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s) | $ Value |
|---|---|---|---|---|
| H. J. Quesnel | UVic, Biology | G. A. Allen | MacMillan Bloedel Research, Burnaby | 14,000 |
| J. W. Quick | UBC, Mechanical Engineering | I. S. Gartshore | H. A. Simons Ltd., Vancouver | 14,000 |
| M. Reid | SFU, Biological Science | B. D. Roitberg | Pacific Forest Centre, Victoria | 11,800 |
| A. Roth | UBC, Soil Science | S. M. Berch | MacMillan Bloedel Research, Burnaby | 14,000 |
| B. Scott | UBC, Zoology/Research Ecology | C. Walters | 1) Deep Sea Trawlers Assoc. of B.C., Surrey<br>2) Dept. of Fisheries & Oceans Vancouver | 14,000 |
| B. E. Taylor | UBC, Zoology | T. H. Carefoot | Pacific Biological Station, Nanaimo | 14,000 |
| M. Von Keyserlingk | UBC, Animal Science | J.A. Shelford | Ritchie-Smith Feeds, Abbotsford | 14,000 |
| | | | **Subtotal (32 Awards)** | **394,800** |

## 3. RENEWAL AWARDS - Year 3 (Competition GC-9)

| Name of Student | University & Department(s) | Name(s) of Academic Supervisor(s) | Name(s) of Cooperating Organization(s) | $ Value |
|---|---|---|---|---|
| J. R. Brown | SFU, Biology | M. Smith<br>A. Beckenbach | 1) Min. Environment, Surrey<br>2) Pacific Aqua Foods Ltd., Vancouver | 14,000 |
| B. Girard | UBC, Food Science | S. Nakai | Fisheries Council of B.C., Vancouver | 14,000 |
| D. B. Parker | UVic, Biology | N. Sherwood | General Sea Harvest Corp., Vancouver | 14,000 |
| C. Third | UBC, Metals & Materials Engineering | F. Weinberg | Johnson Matthey Electronics, Trail | 14,000 |
| P. Thompson | UBC, Botany & Oceanography | P.J. Harrison | Veliger Aquaculture, Nanoose Bay | 14,000 |
| | | | **Subtotal (5 Awards)** | **70,000** |
| | | | **Total (71 Awards)** | **855,879** |

# S.T.A.R.S. SCHOLARSHIPS AWARDED 1989-90

## 1. NEW AWARDS (SC-2)

| Name of Student | University & Department | Name of Academic Supervisor | Cooperating Organization | $ Value |
|---|---|---|---|---|
| G. Cross | UVIC, Chemistry | T. Fyles | CB Research International Corp., Sidney | 25,000 |
| D. Heath | UBC, Animal Science | G. Iwama | Yellow Island Aquaculture Ltd., Campbell River | 25,000 |
| P. MacDonald | SFU, Systems Science | W.S. Havens | MacDonald Dettwiler & Assoc., Richmond | 25,000 |
| | | | **Subtotal (3 awards)** | **75,000** |

## 2. RENEWAL AWARDS (SC-2)

| Name of Student | University & Department | Name of Academic Supervisor | Cooperating Organization | $ Value |
|---|---|---|---|---|
| M. Borugian | UBC, Microbiology | J.G. Levy | Quadra Logic Tech. Inc., Vancouver | 25,000 |
| A. Sy | UBC, Civil Engineering | R. Campenella | Klohn Leonoff Ltd., Richmond | 25,000 |
| | | | **Subtotal (2 awards)** | **50,000** |
| | | | **Total (5 awards)** | **125,000** |

# MARKET ASSESSMENT FOR RESEARCH & TECHNOLOGY (M.A.R.T.) GRANTS AWARDED 1988-90

## 1. M.A.R.T. GRANTS AWARDED 1988-89

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1988-89 |
|---|---|---|
| Dr. M. Blades<br>UBC, Chemistry | Low power RF plasma torch & sample | 9,350 |
| Dr. T. Tiejde<br>UBC, Physics | Scanning tunnelling microscope | 7,700 |
| Dr. L. Dryden<br>Camosun College | Administrative software system for small-medium sized post secondary schools | 14,180 |
| Dr. B.V. Funt<br>SFU, Computing Science | Color constancy device | 11,100 |
| Dr. L. Funt<br>SFU, Chemistry | The first soluble conducting polymer | 10,900 |
| Dr. R. Hardy<br>SFU, Engineering Science | Dual latency LAN technology | 11,200 |
| Dr. P. Hill<br>UBC, Mechanical Engineering | Intensifier injector for gaseous fuel | 11,100 |
| Dr. W. Little<br>UVIC, Electrical & Computer Engineering | Registered hand held scanner | 13,500 |
| Dr. D. McAdam<br>UBC, Physics | Radiant heating panels | 14,500 |
| Dr. B. Miremadi<br>SFU, Energy Resources | Ultra fine alumina process | 11,000 |
| Dr. B. Narod<br>UBC, Geophysics and Astronomy | Direct coupled fluxgate current sensor | 11,950 |
| Dr. C. Oloman<br>UBC, Chemical Engineering | Electrosynthesis of alkaline peroxide solutions | 8,620 |
| Mr. G. Richards<br>BCIT, Interactive Videodisc Development Centre | Interactive video discs | 17,180 |
| Dr. K. Rieckhoff<br>SFU, Physics | Surface tension meter | 4,875 |
| | **Total (14 awards)** | **157,155** |

## 2. M.A.R.T. GRANTS AWARDED 1989-90

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. A.F. Burton<br>UBC, Biochemistry | Market potential for amino sugars in B.C. | 18,500 |
| Dr. N. Cercone<br>SFU, Systems Science | Natural language interface to SQL relational databases | 18,000 |
| Dr. A.C. Chaklader<br>UBC, Metals & Materials Engineering | Sintered carbide products manufactured from Alumina-SiC composites | 15,500 |
| Mr. J.L. Chuma<br>UBC, Physics | OPDATA - Analysis & graphical representation of scientific data | 16,000 |
| Dr. H. Davis<br>UBC, Physics | Mouth controlled mouse emulator | 15,000 |
| Dr. T. Durance<br>UBC, Food Science | Sialic acid and cystatin | 12,000 |
| Dr. P. Fankboner<br>SFU, Biological Sciences | Commercial pearl culture in abalone | 19,000 |
| Dr. R. Hobson<br>SFU, Computing Science | A new desk-top computer concept | 15,900 |
| J.D. Jones<br>SFU, Engineering Science | IntelCAD, artificial intelligence aided design | 19,000 |
| Dr. R. Morrison<br>SFU, Physics | Chemical vapor deposition of thin films of semiconducting iron pyrite ($FeS_2$) and reactor for vapor deposition of thin films | 17,700 |
| Dr. B. Tabarrok<br>UVIC, Mechanical Engineering | The UTEMP program | 19,650 |
| Dr. G.W. Vickers<br>UVIC, Mechanical Engineering | ShipCAM - Ship hull manufacturing software | 19,000 |
| Dr. G.W. Vickers<br>UVIC, Mechanical Engineering | Centrifugal reverse osmosis desalination unit | 16,000 |
| Dr. A. Zielinski<br>UVIC, Electrical Engineering | New electronic pain meter for sufferers of arthritis. | 15,900 |
| | **Total (14 awards)** | **237,150** |

## SCIENCE COUNCIL OF B.C. –

**Schedule of Health Development Fund (HDF-SCBC) Commitments for the year ended March 31, 1990**

### 1. HEALTH DEVELOPMENT FUND (SCBC) COMPETITION #1 (HDF-1)

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Mr. G.F. Auchinleck<br>Andronic Devices Ltd.,<br>Vancouver | Development & evaluation of advanced robotic manipulators for surgery, Phase II | 118,000 |
| Dr. M.P. Beddoes<br>UBC, Electrical Engineering | Major improvement of a talking stenograph for blind users and for sighted users | 40,000 |
| Mr. H.M. Chandler<br>Totem Diagnostics Inc.,<br>Vancouver | Development of an automated immunoassay system | 85,000 |
| Dr. D. Dolphin<br>UBC, Chemistry & Microbiology | Development of third generation photosensitizers and their delivery systems for photodynamic therapy | 115,000 |
| Dr. C.P. Duncan<br>Vancouver General Hospital,<br>Vancouver | Antibiotic loaded joint prothesis for the management of infection | 57,975 |
| Mr. R.W. Evans<br>B.C.'s Children's Hospital,<br>Vancouver | Development of a computerized clinical equipment parts purchasing and equipment data conversion program | 26,275 |
| Dr. W. Godolphin<br>Andronic Technologies Inc.,<br>Vancouver | Automated blood processing system | 125,848 |
| Mr. R.E. Hannah<br>Arbutus Society for Children,<br>Victoria | Development of computer aided design and manufacturing techniques (CAD/CAM) for use in special seating | 53,050 |
| Mr. I. Isbister<br>Med*Ex Diagnostics of Canada Inc.,<br>Coquitlam | Development of a spring version dynatrac | 26,000 |
| Dr. C.A. Laszlo<br>UBC, Electrical Engineering | Development of a magnetic stimulator | 41,462 |
| Dr. B.A. MacLeod<br>UBC, Pharmacology | Improved I.V. regional block | 9,345 |
| Dr. J.R. Moehr<br>UVIC, Health Information Science | Computer technology for medical communication (CTMC) | 54,545 |

## 1. HEALTH DEVELOPMENT FUND (SCBC) COMPETITION #1 (HDF-1)

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Mr. P. Nix<br>E.V.S. Consultants Ltd.,<br>North Vancouver | Development of a sediment sampler to monitor fecal contamination | 25,500 |
| Dr. B. Palcic<br>Cancer Control Agency of B.C.,<br>Vancouver | Research and development of a endoscopic fluorescence imaging apparatus | 100,000 |
| Dr. A. Zielinski<br>UVIC, Electrical & Computing Engineering | Development of an electronic guiding system for the visually impaired | 29,000 |
| Awards Declined | 1 Award | 43,000 |
| | **HDF-SCBC #1 (HDF-l) Total $ Committed 1989-90 (15 Projects)** | **950,000** |

# SCIENCE COUNCIL OF B.C. – B.C. HEALTH CARE RESEARCH FOUNDATION

**Schedule of Health Development Fund (HDF-JOINT) Commitments for the year ended March 31, 1990**

## 1. HEALTH DEVELOPMENT FUND (HDF-JOINT) COMPETITION #1 (HDF-1)

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. P.R. Band<br>Cancer Control Agency of B.C.,<br>Vancouver | Geographic distribution of cancer incidence in British Columbia | 74,244 |
| Dr. J.L. Bert<br>UBC, Chemical Engineering | Detection of carcinogens in the workplace: development of a job exposure matrix for the mining industry of B.C. | 43,256 |
| Dr. M.J. Breault<br>UBC, Orthopaedics | Automated operative assisting device | 128,000 |
| Dr. P. Coy<br>Victoria Cancer Clinic,<br>Victoria | Data base for lung cancer management evaluation: outcome vs. cost | 119,200 |
| Dr. W. Godolphin<br>Andronic Technologies Inc.,<br>Vancouver | A study of serialization in the clinical laboratory | 69,620 |

## 1. HEALTH DEVELOPMENT FUND (HDF-JOINT) COMPETITION #1 (HDF-1) - *Continued*

| GRANT RECIPIENT & ORGANIZATION | PROJECT DESCRIPTION | TOTAL $ COMMITTED 1989-90 |
|---|---|---|
| Dr. C. Hershler<br>G.F. Strong Rehabilitation Centre,<br>Vancouver | Heavy metal incorporated urethral catheter | 28,886 |
| Dr. C. Hertzman<br>UBC, Health Care and Epidemiology | Parkinson's disease: a case-control study of occupational and environmental risk factors | 55,000 |
| Dr. J. Levy<br>Quadra Logic Technologies Inc.,<br>Vancouver | Development of bone marrow purging technology for autologous bone marrow transplanation in acute leukemia | 60,400 |
| Dr. M. Barer<br>UBC, Health Sciences | Health database linkage project: a feasibility study | 149,884 |
| Dr. W. Mackenize<br>B.C.'s Children's Hospital/UBC,<br>Orthopaedic Surgery | A study of femoral forces during limb lengthening | 25,938 |
| Dr. A.J. MacNab<br>UBC, Paediatrics | Noise, vibration, and gravitational forces in paediatric transport: risk of morbidity | 26,091 |
| Mr. C. Saunders<br>Shape Technologies Inc.,<br>North Vancouver | Development of a CAD/CAM system for spinal orthotics. | 34,325 |
| Dr. C.H. Sherlock<br>UBC, Division of Medical Microbiology | Use of nucleic acid probes and the polymerase chain reaction for detection and typing of human papilloma viruses in cervical tissue | 102,600 |
| Dr. S. Tredwell<br>UBC, Orthopaedic Surgery | The assessment of a new index of long bone deformity applied to paediatric forearm fracture, and its implications in remodelling | 10,650 |
| | **HDF-Joint Total Committed 1989-90 (14 Projects)** | **928,094** |

SCIENCE COUNCIL OF
BRITISH COLUMBIA

# FINANCIAL STATEMENTS

FOR THE YEAR ENDED
MARCH 31, 1990

# AUDITORS' REPORT

## To the Minister of Advanced Education, Training and Technology

*We have examined the balance sheet of the Science Council of British Columbia as at March 31, 1990 and the statements of research receipts, expenditures and appropriations; S.P.A.R.K. receipts, expenditures and appropriations; operations receipts, expenditures and appropriations; and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.*

*In our opinion, these financial statements present fairly the financial position of the Council as at March 31, 1990 and the results of its operations and changes in its financial position for the year then ended in accordance with generally accepted accounting principles, as modified by Note 2 to the financial statements, applied on a basis consistent with that of the preceding year.*

Dyke & Howard

*Vancouver, B.C.*
*May 18, 1990*

*Chartered Accountants*

## BALANCE SHEET AS AT MARCH 31, 1990

### ASSETS

| | 1990 | 1989 |
|---|---|---|
| CASH | $ 1,583,392 | $ 934,654 |
| SHORT-TERM INVESTMENTS | 7,247,788 | 10,990,366 |
| ACCOUNTS RECEIVABLE | 104,618 | 47,838 |
| GRANTS RECEIVABLE | 11,057,423 | 2,982,139 |
| INTEREST RECEIVABLE | 43,953 | 23,838 |
| | $ 20,037,174 | $ 14,978,835 |

### LIABILITIES

| | | |
|---|---|---|
| ACCOUNTS PAYABLE AND ACCRUED LIABILITIES | $ 245,967 | $ 200,627 |
| DEFERRED GRANTS | - | 100,678 |
| | 245,967 | 301,305 |

### APPROPRIATIONS

| | | |
|---|---|---|
| RESEARCH | 19,657,389 | 14,426,009 |
| STRATEGIC PLANNING FOR APPLIED RESEARCH AND KNOWLEDGE (S.P.A.R.K.) (Note 4) | 48,485 | 191,440 |
| OPERATIONS | 85,333 | 60,081 |
| | 19,791,207 | 14,677,530 |
| | $ 20,037,174 | $ 14,978,835 |

Approved by the Council

# STATEMENT OF RESEARCH RECEIPTS, EXPENDITURES AND APPROPRIATIONS
## YEAR ENDED MARCH 31, 1990

| | 1990 | 1989 |
|---|---|---|
| **RESEARCH RECEIPTS** | | |
| Grants from the Province of British Columbia (Schedule 1) | $ 16,368,946 | $ 15,641,394 |
| Contribution from the British Columbia Health Care Research Foundation | 359,214 | - |
| Interest | 1,392,514 | 300,068 |
| Refunds of prior years' research expenditures | 84,142 | 51,019 |
| Other | - | 34,912 |
| | 18,204,816 | 16,027,393 |
| RESEARCH EXPENDITURES (Schedule 2) | 11,834,026 | 4,020,048 |
| TRANSFER TO OPERATIONS | 594,410 | 260,000 |
| TRANSFER TO S.P.A.R.K. | 545,000 | 443,341 |
| | 12,973,436 | 4,723,389 |
| EXCESS OF RECEIPTS OVER EXPENDITURES | 5,231,380 | 11,304,004 |
| RESEARCH APPROPRIATIONS, beginning of year | 14,426,009 | 3,122,005 |
| RESEARCH APPROPRIATIONS, end of year (encumbered by outstanding commitments) | $ 19,657,389 | $ 14,426,009 |

## STATEMENT OF S.P.A.R.K. RECEIPTS, EXPENDITURES AND APPROPRIATIONS
## YEAR ENDED MARCH 31, 1990

| | 1990 | 1989 |
|---|---|---|
| S.P.A.R.K. RECEIPTS | | |
| Grants from the Province of British Columbia | $ 90,000 | $ - |
| Grants from the Government of Canada | 200,000 | 100,000 |
| Transfer from Research | 545,000 | 443,341 |
| Other receipts | 127,284 | - |
| | 962,284 | 543,341 |
| S.P.A.R.K. EXPENDITURES | | |
| Operations | | |
| Communications and travel | 74,171 | 61,616 |
| Co-ordinator fees | 86,500 | 133,000 |
| Furniture and equipment | 89,009 | 23,027 |
| Office | 28,348 | 19,944 |
| Rent and leasehold improvements | 56,522 | - |
| Salaries and benefits | 42,723 | 22,110 |
| Workshops and forums | 65,190 | 10,891 |
| | 442,463 | 270,588 |
| Programs | | |
| Aerospace | 3,000 | - |
| Agriculture | 7,500 | 2,269 |
| Aquatic resources | 40,332 | 5,830 |
| Biotechnology | 35,180 | 465 |
| Construction | 65,335 | 10,184 |
| Energy | 1,039 | 1,932 |
| Environment | 89,856 | - |
| Fiscal | 36,403 | 50 |
| Forestry | 25,776 | 5,332 |
| Health | 77,064 | 10,810 |
| Information technology | 61,069 | 956 |
| Manufacturing | 96,874 | 17,036 |
| Mining | 96,866 | - |
| Opportunities in space | 12,321 | 3,500 |
| Superconductivity | 2,000 | 10,965 |
| Transportation | 12,161 | 11,984 |
| | 662,776 | 81,313 |
| TOTAL EXPENDITURES | 1,105,239 | 351,901 |
| EXCESS (DEFICIENCY) OF RECEIPTS OVER EXPENDITURES | (142,955) | 191,440 |
| S.P.A.R.K. APPROPRIATIONS, beginning of year | 191,440 | - |
| S.P.A.R.K. APPROPRIATIONS, end of year | $ 48,485 | $ 191,440 |

# STATEMENT OF OPERATIONS RECEIPTS, EXPENDITURES AND APPROPRIATIONS
## YEAR ENDED MARCH 31, 1990

| | 1990 | 1989 |
|---|---|---|
| OPERATIONS RECEIPTS | | |
| Grant from the Province of British Columbia | $ 300,000 | $ 300,000 |
| Interest | 7,872 | 8,420 |
| Transfer from Research | 594,410 | 260,000 |
| Recoveries | | |
| Advanced Systems Foundation | - | 22,108 |
| British Columbia Health Care Research Foundation | 175,382 | 143,421 |
| Other | 13,823 | 25,651 |
| | 1,091,487 | 759,600 |
| EXPENDITURES | | |
| Computer consultants | - | 2,555 |
| Computer services | 4,216 | 7,611 |
| Consulting and temporary staff | 32,113 | 21,164 |
| Dues and memberships | 955 | - |
| Furniture and equipment | 61,904 | 120,223 |
| Leasehold improvements | 2,614 | 1,905 |
| Meetings | 16,476 | 5,754 |
| Non-recoverable costs | - | 8,130 |
| Personnel - recruitment | 48,156 | - |
| Photocopying and printing | 52,217 | 42,685 |
| Postage and courier | 33,375 | 22,422 |
| Professional development | 9,510 | - |
| Professional fees | 14,061 | 15,989 |
| Publications | 3,517 | 3,197 |
| Rent | 63,586 | 60,705 |
| Salaries and employee benefits | 628,641 | 357,748 |
| Stationery and supplies | 15,913 | 10,555 |
| Telephone | 21,043 | 19,707 |
| Travel | 57,938 | 38,204 |
| | 1,066,235 | 738,554 |
| EXCESS OF RECEIPTS OVER EXPENDITURES | 25,252 | 21,046 |
| OPERATIONS APPROPRIATIONS, beginning of year | 60,081 | 39,035 |
| OPERATIONS APPROPRIATIONS, end of year | $ 85,333 | $ 60,081 |

## STATEMENT OF CHANGES IN FINANCIAL POSITION
## YEAR ENDED MARCH 31, 1990

| | 1990 | 1989 |
|---|---|---|
| CASH PROVIDED FOR (USED BY) OPERATING ACTIVITIES | | |
| Excess of receipts over disbursements | | |
| Research | $ 5,231,380 | $ 11,304,004 |
| S.P.A.R.K. | (142,955) | 191,440 |
| Operations | 25,252 | 21,046 |
| Net change in non-cash working capital accounts | (8,207,517) | (2,598,813) |
| DECREASE IN CASH DURING THE YEAR | (3,093,840) | 8,917,677 |
| CASH AND SHORT-TERM INVESTMENTS, beginning of year | 11,925,020 | 3,007,343 |
| CASH AND SHORT-TERM INVESTMENTS, end of year | $ 8,831,180 | $ 11,925,020 |

**Schedule 1**

## SCHEDULE OF RESEARCH RECEIPTS FROM THE PROVINCE OF BRITISH COLUMBIA YEAR ENDED MARCH 31, 1990

| | 1990 | 1989 |
|---|---|---|
| PROVINCIAL RESEARCH GRANT | $ 3,500,000 | $ 4,000,000 |
| PROVINCIAL GRANTS | | |
| HDF | 1,456,796 | 1,438,865 |
| MART | 237,150 | 166,975 |
| PUBLIC AWARENESS | 175,000 | - |
| STDF | 8,500,000 | 8,035,554 |
| STDF SUPPLEMENT | 2,000,000 | 2,000,000 |
| TEST | 500,000 | - |
| | $ 16,368,946 | $ 15,641,394 |

# SCIENCE COUNCIL OF BRITISH COLUMBIA
## SCHEDULE OF COMMITMENTS AND DISBURSEMENTS OF SCIENCE COUNCIL RESEARCH GRANTS
## YEAR ENDED MARCH 31, 1990

**Schedule 2**

| | Known Outstanding Commitments Beginning of Year | Additional Commitments During Year | Commitment Reductions During Year | Disbursed During Year | Known Outstanding Commitments End of Year | Estimated Renewed Commitments 1990-1991 | Known and Estimated Outstanding Commitments March 31, 1990 |
|---|---|---|---|---|---|---|---|
| RESEARCH GRANTS | | | | | | | |
| Research Competition #12 | $ 23,145 | $ - | $ 11,168 | $ 11,977 | $ - | $ - | $ - |
| Research Competition #13 | 34,257 | - | - | 1,635 | 32,622 | - | 32,622 |
| Research Competition #14 | 15,966 | - | 159 | 15,807 | - | - | - |
| Research Competition #15 | 27,078 | - | 8,217 | 18,861 | - | - | - |
| Research Competition #16 | 188,825 | - | 8,732 | 112,242 | 67,851 | - | 67,851 |
| Research Competition #17 | 425,178 | - | 44,595 | 245,817 | 134,766 | - | 134,766 |
| Research Competition #18 | 918,263 | - | 41,234 | 635,713 | 241,316 | - | 241,316 |
| Research Competition #19 | 2,258,020 | - | 115,714 | 1,451,712 | 690,594 | - | 690,594 |
| Research Competition #20 | - | 2,860,170 | 70,007 | 1,217,287 | 1,572,876 | 1,500,000 | 3,072,876 |
| | 3,890,732 | 2,860,170 | 299,826 | 3,711,051 | 2,740,025 | 1,500,000 | 4,240,025 |
| GREAT - GC9 | 450,000 | 405,879 | 12,437 | 843,442 | - | 540,000 | 540,000 |
| HDF 1988/89-SCBC | - | 950,000 | 31,875 | 361,523 | 556,602 | 700,000 | 1,256,602 |
| HDF 1988/89-JOINT | - | 928,094 | - | 264,000 | 664,094 | 400,000 | 1,064,094 |
| IPDF | 206,250 | 300,000 | - | 287,500 | 218,750 | 200,000 | 418,750 |
| MART 1988/89 | - | 157,155 | 1,477 | 92,936 | 62,742 | - | 62,742 |
| MART 1989/90 | - | 237,150 | - | 70,250 | 166,900 | - | 166,900 |
| SA-I | - | 8,721,789 | - | - | 8,721,789 | 3,800,000 | 12,521,789 |
| STARS | 125,000 | - | 12,500 | 112,500 | - | 100,000 | 100,000 |
| STDF 1988/89 | 8,297,877 | 12,591 | 89,026 | 5,726,502 | 2,494,940 | - | 2,494,940 |
| TEST | - | 500,000 | - | - | 500,000 | - | 500,000 |
| CARRIED FORWARD | 12,969,859 | 15,072,828 | 447,141 | 11,469,704 | 16,125,842 | 7,240,000 | 23,365,842 |

# SCIENCE COUNCIL OF BRITISH COLUMBIA
# SCHEDULE OF COMMITMENTS AND DISBURSEMENTS OF SCIENCE COUNCIL RESEARCH GRANTS
# YEAR ENDED MARCH 31, 1990

**Schedule 2 (Cont'd.)**

| | Known Outstanding Commitments Beginning of Year | Additional Commitments During Year | Commitment Reductions During Year | Disbursed During Year | Known Outstanding Commitments End of Year | Estimated Renewed Commitments 1990-1991 | Known and Estimated Outstanding Commitments March 31, 1990 |
|---|---|---|---|---|---|---|---|
| CARRIED FORWARD | $ 12,969,859 | $ 15,072,828 | $ 447,141 | $ 11,469,704 | $ 16,125,842 | $ 7,240,000 | $ 23,365,842 |
| SPECIAL REQUESTS | | | | | | | |
| T.V. Science Show '87 (Pearl Productions) | 1,000 | - | - | 1,000 | - | - | - |
| TRIUMF | - | 10,000 | - | 10,000 | - | - | - |
| VITRA | - | 15,000 | - | - | 15,000 | - | 15,000 |
| | 1,000 | 25,000 | - | 11,000 | 15,000 | - | 15,000 |
| SPECIAL INITIATIVES | - | 1,250,000 | - | - | 1,250,000 | - | 1,250,000 |
| SPECIAL PROJECTS | | | | | | | |
| Patent Policies Review | 5,000 | 303 | - | 5,303 | - | - | - |
| B.E.S.T. | 25,000 | - | - | 25,000 | - | - | - |
| T.E.S.T. Study | 10,000 | - | - | 10,000 | - | - | - |
| Strategic Planning Study | - | 3,533 | - | 3,533 | - | - | - |
| Human Resource Development Study | - | 5,000 | - | 5,000 | - | - | - |
| Intellectual Property | - | 20,000 | - | 1,000 | 19,000 | - | 19,000 |
| | 40,000 | 28,836 | - | 49,836 | 19,000 | - | 19,000 |
| SCIENCE AWARENESS PROGRAMS | | | | | | | |
| Public Information | - | 122,531 | - | 122,531 | - | - | - |
| Promotions - STDF | - | 24,939 | - | 24,939 | - | - | - |
| Special Promotions | - | 175,000 | - | - | 175,000 | - | 175,000 |
| Science and Engineering Awards | - | 40,958 | - | 40,958 | - | - | - |
| Education Initiative | - | 1,545 | - | 1,545 | - | - | - |
| Travelling Science Show | - | 10,000 | - | 9,000 | 1,000 | - | 1,000 |
| Arts, Science and Technology Centre - Regional Science Fairs 1989 | 14,550 | - | - | 14,550 | - | - | - |
| Arts, Science and Technology Centre - Regional Science Fairs 1990 | - | 25,000 | - | 22,500 | 2,500 | - | 2,500 |
| B.C.S.T.A./F.I.S.A. Book Prize 1989 | 9,500 | - | 4,234 | 5,266 | - | - | - |
| B.C.S.T.A./F.I.S.A. Book Prize 1990 | - | 10,000 | - | 7,636 | 2,364 | - | 2,364 |
| Physics Day Project | 100 | - | - | 100 | - | - | - |
| Stellar Motion | 5,000 | - | - | - | 5,000 | - | 5,000 |
| | 29,150 | 409,973 | 4,234 | 249,025 | 185,864 | - | 185,864 |
| HONORARIA AND OTHER EXPENSES | - | 54,661 | 200 | 54,461 | - | - | - |
| | $ 13,040,009 | $ 16,841,298 | $ 451,575 | $ 11,834,026 | $ 17,595,706 | $ 7,240,000 | $ 24,835,706 |

## NOTES TO THE FINANCIAL STATEMENTS
## MARCH 31, 1990

### 1. ORGANIZATION

During the year the Science Council of British Columbia and the Secretariat on Science, Research and Development were amalgamated and continued as the Science Council of British Columbia.

### 2. ACCOUNTING POLICIES

Basis of Accounting for Receipts, Expenditures and Appropriations
Grant receipts are accounted for in the year the respective grant agreement becomes effective.

Full provision is made for all accrued liabilities except that outstanding research grant commitments, which are conditional on receipt of satisfactory progress reports, are not recorded until disbursed.

Appropriations are comprised of grant receipts (net of transfers and disbursements) that are designated for expenditure under the programs specified in the grant agreement.

Short-Term Investments
Short-term investments are recorded at the lower of cost and market value.

Fixed Assets
Fixed assets are not capitalized and depreciated, but are recorded as expenditures in the period they are purchased.

NOTES TO THE FINANCIAL STATEMENTS
MARCH 31, 1990

3. RESEARCH GRANT COMMITMENTS

During the year, the Science Council approved and committed to fund Research projects (as outlined in Schedule 2), totalling $16,841,298 (1989 - $14,275,058). At March 31, 1990, known outstanding commitments totalled $17,595,706 (1989 - $13,040,009) which, together with additional estimated renewed commitments for the year ending March 31, 1991 of $7,240,000 (1990 - $2,203,442) amount to $24,835,706 (1989 - $15,243,451) in known and estimated outstanding commitments.

During the year the Science and Technology Development Fund (STDF) program and Research Grant Competitions were combined into the "SA" program. The administration of awards under the SA program, as like the predecessor STDF program and Research Grants Competitions, has been contracted to the Science Council by the Ministry of Advanced Education, Training and Technology.

During the year $12,591 (1989 - $8,297,877) and $2,860,170 (1989 - $3,992,490) were committed to under the respective predecessor programs STDF and Research Grant Competitions. Under the SA program $8,721,789 was committed to under SA-1.

4. STRATEGIC PLANNING FOR APPLIED RESEARCH AND KNOWLEDGE (S.P.A.R.K.)

The S.P.A.R.K. program is designed to develop networks to identify opportunities for the application of research and development in various industries throughout the Province of British Columbia. S.P.A.R.K. is funded by grants from the Province of British Columbia, Government of Canada and fees derived from workshops and forums. During the year, the Science Council transferred $545,000 (1989 - $443,341) from Research to the S.P.A.R.K. program.

5. HEALTH DEVELOPMENT FUND (HDF)

The administration of awards under the HDF has been contracted to the Science Council by the Ministry of Advanced Education, Training and Technology. Subsequent to the year end, the HDF 1989/90 grant of $1,456,796 (1989 - $1,438,865) was received.

NOTES TO THE FINANCIAL STATEMENTS
MARCH 31, 1990

## 6. MARKET ASSESSMENT OF RESEARCH AND TECHNOLOGY (MART)

Under the terms of the Federal-Provincial Economic Regional Development agreement-Science and Technology sub-agreement, the Ministry of Advanced Education, Training and Technology has contracted the Science Council to administer awards to candidates at universities, colleges and institutes in the Province of British Columbia. The purpose of the program is to assist in the assessment of the market potential of new technology and research results. During the year the Science Council awarded, and committed for expenditure, the MART 1988/89 and 1989/90 grant fund amounts of $157,155 and $237,150 respectively.

## 7. COMPARATIVE FIGURES

The comparative figures were reported on by another firm of chartered accountants.

Certain 1989 figures have been reclassified to conform with the current year's presentation.